

Application No.: 09/765,806
Amendment dated July 7, 2004
Reply to Office Action of April 8, 2004

Remarks

Claims 1-30 are pending in the application. Claims 1, 9, 18, 19, 21, 22, 23, 26, 28 and 29 are in independent form.

Claim objections

Claim 10 stands objected to for being an improper dependent claim. Amended Claim 10 is a proper dependent claim.

Claims 18, 21, 26, and 28 are objected to as being dependent on a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 18, 21, 26, and 28 are rewritten into independent form.

Rejections under 35 U.S.C. § 102(b)

Claims 1-7, 9-12 and 14-17 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Pat. No. 6,048,588 to Engelsberg.

The Examiner states that Engelsberg discloses a method and apparatus for using a focused beam of ions to deposit material onto a target or to remove material from a target. Applicants respectfully submit that Engelsberg teaches the use of a laser and does not teach a focused beam of ions. This difference is not trivial; optical techniques for focusing charged particle beams are significantly different from techniques used for focusing light. For example, charged particle beams are focused using electric and magnetic fields, not solid, transparent lenses.

Moreover, claim 1 recites "directing a jet of working material towards the target" and that "the ions in the beam inducing a reaction of the working material to deposit material material onto the target or to remove material from the target." Engelsberg teaches the opposite: "Optimally, the gas is inert to the substrate and to the material to be removed." Col. 4, lines 56-57. The purpose of the gas in Engelsberg is to carry away byproducts, not to react.

Applicants submit therefore, that Engelsberg does not anticipate claims 1-7, 9-12, and 14-17 and respectfully requests that the rejection be withdrawn.

Regarding claim 2, the Examiner states Engelsberg teaches using a first lens to forming an

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image of the ion source onto a second lens and forming an image of the aperture on the target with the second lens. While Engelsberg teaches shining the laser through an aperture, it does teach forming an image of an aperture on the target or forming an image of an ion source on a first lens.

Rejections under 35 U.S.C. § 103(a)

Claims 8 and 13 stand rejected under 35 U.S.C. § 103(a) for obviousness over Engelsberg in view of U.S. Pat. No. 5,973,295 to Corbin. Corbin teaches the use of a pen technique to deposit material and does not make up the deficiencies of Engelsberg.

Claims 19, 20, 22, 23 and 29 are rejected as being obvious over Ohnishi in view of Applicant's background disclosure. Claims 19, 20, and 22 each include the first/second lens and aperture limitations as recited in claim 2. As discussed therein, the lenses are configured to form an image of the aperture at the target and at the same time result with a beam at the target having a substantially uniform current density. Ohnishi teaches first and second lenses (condenser and object lenses) and an aperture, but it does not at all teach configuring them in Applicant's described way to achieve a shaped beam—let alone a shaped beam having uniform current density at the target. Accordingly, claims 19, 20, and 22 are not obvious over the cited references.

Claims 23 and 29 each include limitations reciting defocusing (in particular, over-focusing) the beam sufficiently beyond the target plane to achieve a beam at the target plane with either uniform current density or a sharp edge. Again, Ohnishi discloses a first lens, second lens and an aperture, but it clearly does not teach configuring them to create a shaped beam that is over-focused relative to the target plane and that has any of the desired characteristics as described by Applicant. Again, Applicant's background disclosure doesn't add anything except a mention that weak defocusing has been used in certain lithography applications. Therefore, the references fail to teach all of the recited limitations of claims 23 and 29 and thus cannot make them obvious.

Claims 24, 25, 27, and 30 stand rejected as obvious over Ohnishi in view of Applicant's background disclosure and Jones. Each of these claims ultimately depend from either claim 23 or claim 29 and thus are not obvious for the reasons set forth above. In addition, they recite various other features relating to an aperture with a straight edge, a rectangular aperture or placing a straight edge near the center of the beam. The applicant uses Jones to teach these features, but as discussed above, Jones doesn't teach them and in fact, teaches away from them. The aperture of

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Jones is not part of the ion column for passing the beam there through but instead is part of the substrate serving as a form for etching away a field emitter with a desired shape. Thus, the cited references do not teach all of the features of these claims and do not make them obvious.

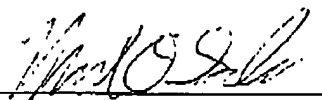
Applicant submits that all claims are now allowable and respectfully requests reconsideration and allowance of the application.

Respectfully submitted,

Date:

7/7/04

By:



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